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Timber Rattlesnakes (*Crotalus horridus*) in Prince William Forest Park: Released Captives or Native Population?

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The timber rattlesnake (*Crotalus horridus*) apparently occurred throughout much of Virginia from the Chesapeake Bay to the mountains before the arrival of Europeans in the early 1600s (Tobey, 1985; Mitchell, in press). Subsequently, the colonists and their descendants cleared much of the landscape of its forest and eliminated many populations of animals (Silver, 1990; Martin & Boyce, 1993), resulting in the elimination of numerous populations of timber rattlesnakes in the Commonwealth. The exceptions were those in mountainous regions, mountain ridges in the Piedmont, and in the uplands and swamps in the southeastern corner of the state (Mitchell, in press). The discovery of two specimens of timber rattlesnakes in Prince William Forest Park, Prince William County, Virginia, in 1991 (Martin et al., 1992) revealed, however, that all of the Piedmont populations may not have become extinct.

The uniqueness of the Prince William Forest Park specimens lies in the fact that they are the only ones known from the lower Piedmont physiographic province. The closest known extant population is in the Bull Run Mountains, some 40 km to the northwest (Martin et al., 1992). Some aspects of the biology of mountain populations are reasonably well-known (Martin, 1992, 1993) but little is known of lowland populations.

This paper contains a review of the history of the discovery of timber rattlesnakes in Prince William Forest Park, an analysis of the phenotypic characteristics of the specimens, and an assessment of the question of whether the specimens were released captives or natural occurrences.

Methodology

The primary method of obtaining information on areas occupied by rattlesnakes was to conduct walk-through transects in likely habitat and conduct nighttime searches on park roads (Scenic Drive) in summer. Areas searched include the southwestern and southern portions of Prince William Forest Park (PWFP), especially along the South Branch of Quantico Creek. Previous sightings and locations of road-killed specimens served to focus field efforts. All appropriate cover objects were examined for snakes, such as logs and rocks, stumps, and other places that may be used as hiding places. Rocky outcroppings were located on maps and evaluated for potential hibernating sites. William H. Martin III accompanied me on one occasion in the fall of 1993 to assess potential den sites and to evaluate the available information on the snakes found in 1991.

Meristic and morphometric data were obtained from PWFP specimens and those from Bull Run Mountains and Shenandoah National Park for comparison. Snout-vent length (SVL) and tail length was measured on preserved specimens with a tape measure to the nearest mm. Number of ventral scales was counted using the Dowling method (Dowling, 1951), where the first ventral is the one connecting the first dorsal scale row on each side. Numbers of subcaudals, dorsal scale rows, and dorsal body blotches were counted using standard techniques (Peters, 1964).

Historical Review

Timber rattlesnakes were not known from Prince William Forest Park until July 1991, despite the fact that the area became federal property in 1936 and has been used extensively for human recreation since that time. The park is composed of approximately 6,920 hectares of former farmland that was allowed to succeed naturally to the mature hardwood forest typical of northern Virginia. The area was farmed extensively for corn, cotton, and tobacco from the early 1700s to about 1930 and then largely abandoned. The lands were purchased as part of a Depression-era program set up as an example of proper stewardship, to encourage the return to natural conditions by preventing soil erosion and stream pollution, and to facilitate reforestation (U.S. Dept. of Interior, 1992).

Until recently, *Crotalus horridus* has not been considered a part of the snake fauna of Prince William County. The locality in northwestern Prince William County plotted in Linzey & Clifford (1981) has been sustantiated recently by W. H. Martin III (pers. comm.) who has observed a specimen on the eastern side of the Bull Run Mountains. Another observation for the county is unverifiable. A note in an unpublished report (Anonymous, date unknown) indicated that a dead timber rattlesnake (size not indicated) had been found in a red-tailed hawk (*Buteo jamaicensis*) nest on Quantico Marine Corps Base sometime during 1971-1975. A parent hawk could have either picked up the snake many kilometers away from its nest, possibly in the Bull Run Mountains, and brought it to the area, or the snake could have been found locally.

The first specimen of *C. horridus* known from Prince William Forest Park was found by G. T. Davis on 13 July 1991 at milepost 7.3 on Scenic Drive (the interior park road). The snake was a 950 mm SVL (1005 mm total length, preserved measurements) gravid female that was kept in captivity until October. Between 20 and 22 August 1991 she gave birth to 9 live neonates and one stillborn (litter size = 10). The live neonates were released in mixed hardwoods south of Scenic Drive and near the location of the female's initial capture on 11 October 1991. None have been recaptured.

The female was also released in the vicinity of her original capture (south of the road in a section of mixed hardwoods) on 11 October 1991. She was subsequently found run over by a car south of the original capture location on Scenic Drive on 19 October 1991. This female and her stillborn neonate were donated to the National Museum of Natural History (USNM 314211 and 314212, respectively).

During the time the female adult was in captivity, a 270 mm SVL (290 mm total length) juvenile *C. horridus* was found dead on Scenic Drive by Marie Frias on 15 September 1991 (USNM 314213).

Other rattlesnake sightings have been reported in Prince William Forest Park and on Quantico Marine Base. An unconfirmed sighting of an "Eastern Diamondback" rattlesnake was reported by K. Thompson on 31 July 1991 from a location east of the High Meadows trail, in the same vicinity in which the first two specimens were located. He noted that it was about 1.3 m long and was crossing Scenic Drive. If this sighting is reliable and the identification was of a timber and not a diamondback rattlesnake, then at least one additional adult was alive in PWFP in late 1991.

A live male timber rattlesnake was found on Engineer Road in the Officer Candidate School area on Quantico Marine Corps Base in early October 1990 (Dolan, 1990). This snake had been injured prior to capture. Its skin had been torn away from the muscle on the lower right jaw. It otherwise appeared healthy. This snake was assumed to have been a released captive; its original capture location is unknown.

To date, no other specimens or reasonably accurate sightings of timber rattlesnakes have been reported in Prince William Forest Park or on Quantico Marine Corps Base.

Phenotypic Characteristics

Meristic and morphometric characteristics of the snakes reported above are compared to samples from the Bull Run Mountains in Fauquier County, the northern section of Shenandoah National Park, and the statewide Virginia sample in Table 1. Scale counts, relationship of tail length to total length, and numbers of dorsal markings on the specimens from Prince William Forest Park and Quantico Marine Corps Base do not differ from the values characteristic of the closest natural populations located farther west in Virginia or from the statewide samples. The number of dorsal scale rows align the two PWFP specimens with southeastern Virginia samples, but they are not the lowland subspecies, *Crotalus horridus atricaudatus*, that is listed as state endangered (Mitchell & Schwab, 1991). The two PWFP specimens do not have the characteristic chestnut middorsal stripe or eye-jaw stripe. Scale counts and tail length/total length values suggest that the juvenile specimen (USNM 314212) is a female.

Unfortunately, these comparisons do not allow us to ascertain whether the snakes were originally captured in Prince William Forest Park (or nearby Quantico) or from another location in their known natural range.

Released Captives or Native Population?

The limited number of sightings in Prince William Forest Park (2) make it difficult to determine the true origin of the snakes. Three lines of evidence were pursued to obtain information that led to a reasonable conclusion: (1) searches for additional specimens and potential den sites, (2) evaluation of the behaviors and physical conditions of the specimens to determine if they were of captive origin, and (3) information on the behavior of the snakes and possible release of captives, and the history of the park.

Road cruising at night and daytime searches for additional specimens yielded no new information. Several potential den sites along the south fork of Quantico Creek near the intersection with the High Meadows Trail were examined in August and September 1993. On 24

October 1993, William H. Martin III accompanied me to several of these sites and confirmed that those on the south-facing bank of the South Fork of Quantico Creek could be potential overwintering sites for one to several snakes. However, there was no external evidence that they were currently being used by any snake. Another difficulty was that it was not possible from external examination to determine whether there were any fissures that would allow snakes to hibernate below the frost line. Thus, the information based on field searches was inconsequential.

I examined the specimens in the National Museum of Natural History for evidence of captive conditions (e.g., rubbed noses, scale wear, parasites). None were apparent on either of the two specimens from PWFP. Lack of evidence does not mean, however, that the snakes were not former captives.

The suggestion that the two snakes were former captives comes from two sources: an unexpected telephone call and the behaviors of the snakes. In early 1992 I received a call from a captive snake breeder in northern Virginia. He indicated that he knew the person who had released these and other snakes in PWFP. This person had apparently been releasing snakes in the park for a number of years. I could not obtain the person's name from him.

As noted by William H. Martin, mid-October is the time that low elevation timber rattlesnakes move from summer foraging areas to winter hibernacula. Adults and juveniles are usually moving towards den sites. Movement of timber rattlesnakes in PWFP should have been towards the rock outcrops along the South Fork of Quantico Creek, assuming these are the only den sites in the area. We do not know the orientation of the two snakes on Scenic Drive when they were killed. However, the fact that the adult female was released over 100 meters south of the road and that she was subsequently found on the road, suggests that she was disoriented. An adult with experience in finding her overwintering site in an area with which she was familiar should have oriented towards the rock outcrops and not back toward Scenic Drive.

Additionally, PWFP receives 200,000–500,000 visitors annually; the latter figure when park day use was free. The cabins have been in continual use since the 1940s with campers who frequently hike all the park's trails. Thus, the probability that naturally occurring timber rattlesnakes could have existed in PWFP since its establishment and gone unnoticed is very low.

Conclusions

The conclusion I draw from the admittedly scanty evidence discussed above is that timber rattlesnakes are not native residents of Prince William Forest Park, although they could have been prior to European settlement. The two and possibly three specimens discovered in 1991 were apparent releases by a well-meaning snake enthusiast who assumed that the snakes would survive in the park's forested habitat.

Releasing snakes that have been held in captivity into areas with which they are unfamiliar may reduce their survivorship, not enhance it, as believed by their well-intended, but uninformed human captors. Such released snakes, like other animals that learn the physical features in their native home ranges, are at a disadvantage compared to native snakes. Non-native individuals will rove over the unfamiliar landscape at high risk to themselves. Such individuals are not likely to survive for long.

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Literature Cited

Anonymous. No Date. The effect of man, weather, and food sources on raptors at Quantico and surrounding areas. Unpublished Report, Quantico Marine Corps Base, Quantico, Virginia. 20 pp.

Dolan, D. 1990. Marines discover rattlesnake at OCS. Quantico Sentry [newspaper], 19 October, pp. A6-A7.

Dowling, H. G. 1951. A proposed standard system of counting ventral scales in snakes. British Journal of Herpetology 1: 97-99.

Linzey, D. W. & M. J. Clifford. 1981. Snakes of Virginia. University Press of Virginia, Charlottesville. 159 pp.

Martin, W. H. 1992. Phenology of the timber rattlesnake (*Crotalus horridus*) in an unglaciated section of the Appalachian Mountains. Pp. 259-277 *In* J. A. Campbell & E. D. Brodie, Jr. (eds.) Biology of the Pitvipers. Silva, Tyler, Texas.

Martin, W. H. 1993. Reproduction of the timber rattlesnake (*Crotalus horridus*) in the Appalachian Mountains. Journal of Herpetology 27:133-143.

Martin, W. H., & S. G. Boyce. 1993. Introduction: the southeastern setting. Pp. 1-46 *In* W. H. Martin, S. G. Boyce, and A. C. Echternacht (eds.), Biodiversity of the Southeastern United States, Lowland Terrestrial Communities. John Wiley & Sons, Inc., New York.

Martin, W. H., J. C. Mitchell, & R. Hoggard. 1992. Geographic distribution: *Crotalus horridus*. Herpetological Review 23: 91.

Mitchell, J. C. in press. The Reptiles of Virginia. Smithsonian Institution Press, Washington, D.C.

Mitchell, J. C., & D. Schwab. 1991. Canebrake rattlesnake, *Crotalus horridus atricaudatus*. Pp. 462-464 *In* K. Terwilliger (Coordinator), Virginia's Endangered Species. McDonald & Woodward Publishing Co., Blacksburg, Virginia.

Peters, J. A. 1964. Dictionary of Herpetology. Hafner Publishing Co., New York. 426 pp.

Silver, T. 1990. A New Face on the Countryside, Indians, Colonists, and Slaves in South Atlantic Forests, 1500–1800. Cambridge University Press, New York. 204 pp.

Tobey, F. J. 1985. Virginia's Amphibians and Reptiles, A Distributional Survey. Virginia Herpetological Society, Purcellville, Virginia. 114 pp.

U.S. Department of Interior. 1992. Draft general management plan, environmental assessment, Prince William Forest Park. National Park Service, U.S. Government Printing Office, Washington, D.C., 70 pp.